SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •

AUGUST 1, 1936

Destroyer and Destroyed

See Page 79

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The Weekly Summary of

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DO YOU KNOW?

Snow contracts with falling temperature.

Ceylon is the principal source of moonstones.

Electric switches that do not click have been developed.

Young fish are fry until they are an inch long, after which they become fingerlings, and at one year they are yearlings.

When driven by hunger and hot weather, grasshoppers of some species grow longer wings and fly away—even to distances of 150 miles.

The oldest traces of Stone Age man found in Soviet territory are stone tools buried with bones of the wolf, ox, wild ass, hare, and other animals in the cave of Kiik Koba in Crimea.

During a recent expedition in the Belgian Congo, Prof. W. K. Gregory observed several Negro albinos with "pale yellowish-pink freckled skin, unpigmented iris, squinting eyes, and light hair."

England celebrated in June the centenary of the birth of the first woman doctor in England, Elizabeth Garrett Anderson.

It takes about ten quarts of milk to make a quart of cream, leaving the skimmilk available for various industrial and food uses.

Although tea seed oil cannot be detected by taste when used in adulterating olive oil, a chemical test reveals the adulteration by a color reaction.

It is the cool temperature—not the morning dew—that makes raspberries picked in early morning keep better than raspberries picked at midday.

To reduce seasickness among passengers crossing the English Channel, a steamer with a non-rolling saloon was tried out in 1875, but the ship was slow and expensive.

The popular term "dust bowl," referring to the principal area of dust storms in this country, has gained official recognition through use in the *Monthly Weather Review*.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

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BIOPHYSICS

Light Works on Seeds Through Chlorophyll

Absorption High in Stimulating Red-Orange, Also in Inhibiting Violet-Blue Region

POSITIVE evidence that sunlight acts on certain seeds through chlorophyll, the green coloring matter of vegetation, was presented to the spectroscopy conference at the Massachusetts Institute of Technology by Dr. Lewis H. Flint of the U. S. Department of Agriculture.

The discovery opens a new approach to the study of light in relation to seed sprouting and growth, plant metabolism, the distribution of plants and other equally important allied problems of the science of life.

The research leading to the find was a continuation of that which Dr. Flint has been conducting on the effects of varying wavelengths of light on lettuce seed. Two years ago he reported to the conference that violet-blue light ranging between 4,400 and 4,800 Angstroms and nearly infra-red light at about 7,600 Angstroms inhibited the growth of the seeds. Yellow, orange and some types of red light, however, ranging from 5,200 to 7,000 Angstroms, were found to promote growth.

This year he announces he has narrowed the limits of the growth-giving light and that the reddish-orange light in the vicinity of 6,700 Angstroms was best for plant growth.

But most significant was his additional discovery that chlorophyll, the green coloring pigment, present in the seeds as well as in grown plants, absorbed more light at this 6,700 point and in the two inhibiting ranges than at any other bands.

"Here is an instance," he said, "in which the apparent critical wavelength of radiation promoting germination coincides with the major absorption in this region by a pigment common to all green plants. The radiation most effective in promoting germination in the seed is that most effectively absorbed by chlorophyll in the same region.

"In the violet-blue region a similar situation exists—the radiation most effective in inhibiting the germination is again that most effectively absorbed by chlorophyll. Thus chlorophyll becomes almost inevitably identified with the reactions of the seed to light, although it should be noted that the absorbed red light promotes germination and the blue light inhibits it.

"Blue light produces a set of physiological reactions quite different from that promoted by reddish-orange light, yet both groups of radiation appear associated with absorption of the respective sorts of radiation by chlorophyll.

"The close analogy places a distinct emphasis upon a new and promising viewpoint."

Dr. E. D. McAlister of the Smithsonian Institution cooperated in the research.

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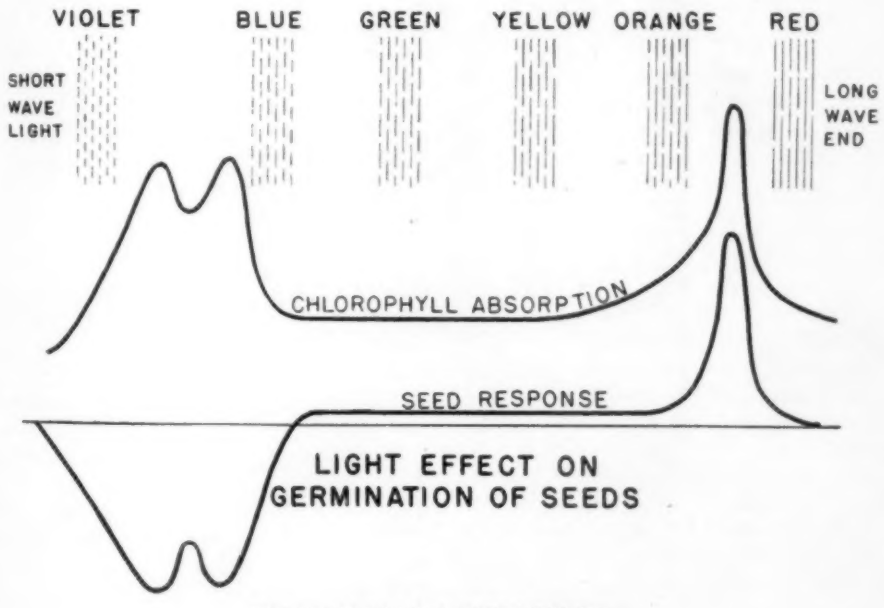

GRAPHICALLY EXPRESSED

Dr. Flint's graph brings out strongly the high absorption by chlorophyll of light in the red-orange and violet-blue regions, and shows the striking contrast of the growth-stimulating effects of the former with the growth-inhibiting effects of the latter.

PHYSICS

New "Dimension" Added In Spectroscopic Research

A NEW method of snapping science's valuable spectroscopic pictures, which adds another "dimension" to the photograph, thus enabling investigators to ferret out minute traces of elusive elements and even to determine in what compounds various metals are present, a heretofore impossible task, was reported to the Massachusetts Institute of Technology spectroscopy conference by David Richardson, research fellow in physics at the Institute.

The discovery may be said to sharpen science's already keen tool, the spectroscope. Many among the 100 scientists attending agreed that this new technique will greatly increase the value of spectroscopy.

Ordinary spectrum photographs reveal the chemical elements present in the substance and tell roughly in how great amounts they are found. The pictures are snapped in a manner generally resembling that used in taking ordinary snapshots.

By moving the photographic plate upward at a constant rate throughout the exposure, instead of keeping it stationary, Mr. Richardson has added another "dimension" to his picture, which makes it possible to determine what is occurring at any instant during the exposure.

Greatest advantage of the new technique is its ability to tell the scientist in what chemical compound a given metal is present, an analysis not possible with ordinary methods. The standard technique, for example, can detect sodium, iron, or any other element, but does not say whether the compound in which it was present was a chloride, a

nitrate, an oxide or some other compound. With Mr. Richardson's technique this is possible, for the width and brightness of the line that reveal the presence of a metal can also be made to divulge the negative radical, the element with which it is associated in the compound.

The addition of the time dimension also enables the scientist to identify minute traces of an element which would escape detection under ordinary methods, and also to determine more accurately than by other methods, the amount of a substance present in the material under investigation.

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PSYCHOLOGY

Boys and Girls Go Through Similar Stages of Growing Up

By PROF. PAUL HANLY FURFEY,
Department of Sociology, The Catholic University of America

A YOUNG human being is a very complicated creature. He is growing in mind and body and personality toward maturity, all at once, but perhaps at different rates.

We are interested in finding out how behavior becomes more mature. The little boy grows out of the stage where he is thrilled by a sandpile, to the stage in which he plays Indian, then on up to baseball days, and his first dress suit, and manhood. For want of a better name, I have called this side of personality, as it unfolds, a child's developmental age.

Age of Make-Believe

Young children up to about ten years of age are individualists—rugged individualists. They enjoy playing together, but they are too young for most games played by teams. It is a great age for make-believe, and the boys dramatize themselves as cowboys, G-men, storekeepers, and all the other grown-up roles that look attractive and important.

At six, the greatest sport in the world is tag, in one form or another. I have seen six-year-olds cheering a game of tag from the sidelines, with all the excitement of fans at a major league ball game.

These young individualists are not ashamed to play with girls. Four out of five think nothing of it until the sixth year, perhaps later. Then, they begin to shut girls out of one sport after another. They are growing toward a new stage of development—the gang age.

Gang age sounds wild and inelegant, but the term does express the wave of devotion that a boy of ten begins to feel for his chosen—gang. He is no longer satisfied to toss a ball in any sort of simple ball game. He wants to belong to a team. Remarkable clubs are formed, with secret passwords, and a clubhouse. The boy is eager to join the Boy Scouts.

The girl too has her age of rugged individualism, but she is not likely to get into as many fist fights as her brother. Her make-believe is concerned with different things. In a study of 35 six-year-old girls and 35 eight-year-olds, we found that every last child had her doll. Four years later this sort of thing has pretty well disappeared.

Girls Have Gangs, Too

The girl has her gang age, too, but not many gangs. That is, the girls show the same get-together spirit as the boys, but it takes different forms, such as informal parties at one another's houses. Both sexes are "joiners" at this age.

The last stage of growing up is adolescence, which begins during high school years and carries the boy or girl into maturity. It is rather curious that this last stage is the least understood of the three—curious, because no age of development has been so much discussed.

Adolescent boys take less interest in affairs of the heart than magazine fiction would make us think. Up to 16 years, less than half the boys we have studied had fallen in love.

More characteristic of the boy nearing manhood is his attitude toward authority. A younger lad is apt to obey any one who speaks authoritatively. An adult has learned to obey and play his part in an ordered universe. But the adolescent is apt to resent commands. He is not yet sure enough of himself to submit gracefully, and the struggle may lead him into trouble at home and at school, or even with the law.

Boys of this age are more apt to be assertive and conceited than shy and retiring. About one boy in five, among younger lads, is bashful. But the older boy is ready to be a man, even before society is ready to accept him in that role.

Girls show some of the same trends at this age. Those we studied took themselves more seriously, showed more poise, took better care of their clothes, and began to be interested in the opposite sex.

The best method we have found for measuring a child's advancement into maturity is to ask which of two items he would prefer.

For instance, we might ask whether he would rather play soldiers or pitch horseshoes; whether he would rather chew gum or go out with a girl; whether he would rather work with tools or play tennis.

"What Do You Read?"

After quizzing him on a long list of such preferences, we get a good cross-section view of his ideas of amusement, and his level of development along that line.

In the same way we check up on the sort of books he would rather read. And we find out whether he thinks it more fun to have certain things than others. For example: Would he rather have a magic lantern or a saxophone, an electric train or a book of detective stories.

We have prepared a number of these lists for both sexes. To find out one preference would mean nothing, unless it was very abnormal. But if you study a list of preferences given by a single child, you can learn a good deal about his personality, and how mature or immature he is.

A boy may be eight according to his birthday record, and very intelligent, and yet only six years old in his personality.

We believe that knowing what is normal maturity for different ages of childhood will be helpful in dealing with problem children, who are out of step with life and miserable over it. Part of their trouble may be simply that they are maturing at a different pace from their friends, or at a widely different pace from their own mental and physical growth.

It is important to take into account this angle of a child's development. To leave out consideration of his maturity is like ignoring something vital. His developmental age is part of him, and he cannot be expected to read books or enjoy games that require a maturity still beyond him.

Wealth or poverty alone do not seem to be responsible for hastening or retarding maturity. But we do find this:

RECORD-BREAKING "IVY STALK"

The photograph shows the discoverer, Jim Shelton, right, and Wesley Ogle, left.

Mothers and fathers who are oversolicitous about their children and take too much care of them, may hinder their development. On the other hand, there are homes in which the children "just grow" like Topsy. If they roam the streets in a poor neighborhood, such children may attain a hard maturity beyond their years.

The popular belief that city boys are more grown-up than country boys is confirmed by tests which we made with nearly 200 boys aged 11 to 13 years.

We found that, at 11 years, the city boy is apt to be a year and a third ahead of the country boy in his ambitions, ideas, sports, and so on. At 12, the city boy is apt to be fully two years more grown up than the country boy. But—this is rather curious—when the boys reach 13 years, there is not so much difference. The country boy has almost caught up with his city cousin, and there is only a third of a year difference between them.

If this is true, then we should not try to fit urban and rural boys into the same mould. Recreational programs should not be taken over bodily from the city and applied to country boys without making allowance for urban precocity. Books written for parents should take account of these differences.

Altogether, modern social science is making a determined effort to treat the child as an individual. To do this intelligently, we need to know what is normal and what leads to favorable or unfavorable results.

This does not mean that we shall ever reduce a human being to a mathematical formula; but it does mean that a discreet use of tests and measurements can be very helpful.

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PLANT PATHOLOGY

Tropical Tobaccos In "Health" Contest

NOT all the health contests are for bouncing babies. Government scientists, seeking tobaccos that will resist disease, have planted seed from over 600 samples of tobacco gathered in tropical America.

Among the diseases that now cause huge loss to the tobacco crop each year are included wildfire, blackfire, mosaic, mildew, stem rot, wilt, black shank, root knot, and black root rot.

The region where the seed was collected, in Mexico, Central America and northern South America, is undoubtedly the native home of the tobacco plant, declares Dr. E. E. Clayton, tobacco disease specialist of the U. S. Department of Agriculture. But this is the first systematic effort to collect and test some of the innumerable types and varieties that have existed there for centuries.

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BOTANY

Giant Mountain Laurel Found in Great Smokies

"WHEN bigger mountain laurels are grown, the Smokies will grow 'em," declared Dr. H. M. Jennison, of the University of Tennessee, following his verification of the find of a veritable giant laurel in the Great Smoky Mountains National Park. The butt of the giant laurel measures 82 inches in diameter—quite a find, considering that the largest laurel previously listed in the Great Smokies Park was 21.6 inches in diameter. One limb of the plant was found to be 31 inches in diameter, measured through its base.

There is a confusion of names for shrubs, in the Great Smokies. What is locally called laurel is really rhododendron; the great "laurel slicks" on the mountainsides are dense jungles of rhododendron bushes. The true mountain laurel is known only as ivy in the Smokies. One mountaineer remarked to Professor Jennison, as two men examined the giant mountain laurel bush, "I don't reckon many people hain't never saw thet ivy stalk!"

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ZOOLOGY

Bears Follow the Grub 50 Miles Over Mountain

BEARS, like hoboes, seem to have an uncanny knack of finding out where the hand-outs grow.

When Yellowstone National Park opened up for the tourist season last spring, the bear "cafeteria" at Old Faithful, where the Bruins have for years been regaling themselves nightly on hotel and camp table scraps, was shut down in accordance with the Park Service policy of making the bears rustle for their own grub. Only the "cafeteria" at the Grand Canyon of the Yellowstone, about fifty miles away, was kept open for business this season.

Now, Ranger Wayne Replogle, who got to know a lot of the bears at sight during several seasons on "bear ground" duty at Old Faithful, has recognized quite a number of his old friends in the new locality.

It looks as though an old song will have to be revised:

"The bears went over the mountain, to see what they could see—
"Free grub by the side of the Canyon was all they cared to see!"

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PHYSIOLOGY

Blood Pigment Analysis Gives Clue to Oxygen Use

FIRST complete analysis of the spectrum of hemoglobin, the complex blood pigment that carries life-giving oxygen from the lungs to the rest of the body, was reported to the spectroscopy conference at the Massachusetts Institute of Technology by Dr. David L. Drabkin of the University of Pennsylvania.

His investigation, made with the spectroscope, reveals much unexpected information concerning the body's oxygen carrier, whose importance scientists realize well, but about which much remains to be learned.

The research is expected to afford scientists a better understanding of the nature of the union of hemoglobin and oxygen or other gases, and of the energy changes involved in this union.

Enormous Molecules

Why nature has chosen a colored pigment to carry oxygen, why hemoglobin with its huge molecular weight of 68,000 is used to carry oxygen whose molecular weight of only 32 seems insignificant in comparison, how the globin is attached to the iron-porphyrin groups are other problems Dr. Drabkin's research may solve by its analysis of the whole living blood.

On the answers may hang some of the most important and valuable discoveries medicine has made concerning the human body in recent years.

Dr. Drabkin used the spectroscope in his investigation to analyze the light given off by hemoglobin when he hurled tiny electrons into the very atoms of which the plasma is composed.

The most significant fact disclosed was the unexpected one that the telltale rainbows of light, by which substances are identified, were regularly spaced along the spectrum, and that the complete picture of hemoglobin represented the additive result of the individual characteristic bands, whose structure could be expressed mathematically.

This regular spacing, previously demonstrated only with relatively simple chemical substances, enabled Dr. Drabkin to derive a formula which tremendously simplifies the complicated spectroscopic picture scientists have had of the hemoglobin spectrum.

"This new analysis," Dr. Drabkin told the conference, "has proved remarkably adequate for this type of complex, organic compound, and may prove to have more general usefulness and significance. It is gratifying, for the present, that it has proved possible to express the complex pattern in simple mathematical terms, as a summation of normal curves."

Particularly striking was Dr. Drabkin's discovery that, although many of the properties of hemoglobin are ascribed to its protein constituent, globin, spectroscopic analysis has indicated that the iron-porphyrin group may play a more important role. This is borne out by the close resemblance of the pictures of hemoglobin compound to that of potassium ferricyanide, a simple iron derivative.

Dr. Drabkin also succeeded in simplifying pictures of complex hemoglobin derivatives, which, although widely different under ordinary conditions, were disclosed upon analysis to be fundamentally alike in nature.

Analyze Gland Secretions

A new method for the somewhat similar use of the spectroscope to detect sodium and potassium in important research on gland secretions, was reported to the conference by Dr. G. O. Langstroth, of McGill University, who with D. R. McRae and Prof. J. S. Foster, has been conducting quantitative analyses of these vital fluids.

The importance of the body's many glands, which range in size from the microscopic peptic glands of the stomach, to the liver, the largest glandular organ, has been recognized for some time, but there are still many questions concerning them which science has been unable to answer.

Any step toward a solution of these problems which will bring scientists nearer to an understanding of the functions and methods of various gland secretions is important, since it may contribute to curative measures in diseases resulting from gland failure. By use of insulin, produced by a part of the pancreas, for example, medicine is now able to control dread diabetes. Injection of this secretion into the patient makes up a deficiency in the natural production.

Most attempts to study gland secretions have been hindered by the inability of scientists to obtain appreciable amounts of them, but the method announced by Dr. Langstroth overcomes this obstacle by requiring only a quarter of a cubic centimeter sample, about five or six drops, for a complete determination for both sodium and potassium.

Nor does the investigation depend on the form in which either of the elements is present, nor, within reasonable limits, on the extraneous composition of the sample.

Dr. Langstroth estimated the precision for a single determination to be about 10 per cent, but an idea of the reliability of the method can be gained from his report that in a series of 40 pairs of determinations the average deviation from the mean was less than five per cent. The method also has the usual advantage of the spectroscope, exceptional simplicity in comparison with other techniques.

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A COMET POSES

Peltier's comet, photographed with the eight-foot star camera of the Cook Observatory, Wynnewood, Pa., by Dr. Orren Mohler, of the Cook Observatory staff. The comet's faint tail can be seen, extending upwards and to the right. In order to secure a sharp picture of the comet, the camera was kept pointed towards it while it was moving against the starry background. This photograph had an exposure of one hour, and so the stars appear as trails.

ASTRONOMY

Russian Astronomer Defended Against Party

NEWS from Moscow that a leading Soviet astronomer, Prof. Boris Gerasimovitch (Gerasimovic), head of Pulkovo Observatory in Leningrad, had been criticized by Leningrad's Communist party newspaper for "servility" toward foreign science recalls the general American feeling that science is world-wide activity with a minimum of national ties.

In response to an inquiry from Science Service, Dr. Harlow Shapley, director of Harvard College Observatory, said:

"Astronomy has always been distinctly international and publication of scientific results and theories in foreign journals is natural and sometimes the only effective procedure."

Prof. Gerasimovitch in the Leningrad *Pravda's* attack had been taken to task for publishing results of his observatory in foreign journals.

Dr. Shapley said further that Prof. Gerasimovitch should be ranked as one of the leading astronomers of Europe.

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ASTRONOMY

Japanese Astronomer Discovers New Comet

TWO comets in the sky, both visible to keen eyes that know where to look, are intriguing astronomers just now. One of these, Kaho's comet, has just been discovered by an amateur Japanese astronomer, Siguro Kaho, whose name it bears. The other is Peltier's comet, discovered in May by Leslie C. Peltier, Ohio amateur. (*See* SNL, May 30.)

Tokyo, Lick, Yerkes, Harvard observatories and Tashkent Observatory in Turkestan have confirmed the existence of Kaho's comet, which like Peltier's comet, was picked up by an amateur variable star observer. Siguro Kaho, after sighting the new heavenly object with his small telescope at Sappora, Japan, reported its existence to Tokyo Observatory, whence the astronomical world was bulletined the news in coded cable messages through the international astronomical clearing house at Copenhagen. Dr. Harlow Shapley, director of Harvard Observatory, received the news and notified American observatories.

From a photograph made at Harvard's Oak Ridge Observatory by L. E. Cunningham, the position of the comet was computed as right ascension 9 hours, 5 minutes, 20 seconds, and declination north 35 degrees, 59 minutes, 50 seconds with a very small motion.

When discovered, it was of the sixth magnitude, which is just about the limit of possible seeing with the unaided eyes. It is low in the northwestern sky just after sunset, well below the constellation of the Great Bear or Ursa Major in which the Big Dipper is located, and it is not far from the two brightest stars of the Lynx. The new comet has a definite nucleus and a tail nearly a degree long, pointing away from the sun.

Peltier's comet is moving in the northeastern sky and is increasing in brilliance day by day. It will be at its peak on Aug. 4, when it will be sixteen million miles from earth.

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ENGINEERING

World Power Conference To be Held in Washington

WHAT the present "Power Age" is coming to, and how the nations are putting their coal, oil, and water to work most effectively will be discussed in Washington, when experts from 46 nations gather for the Third World Power Conference, September 7 to 12.

The two previous international gatherings of this type, in London and Berlin, stressed technical problems of engineering. The Washington conference is expected to give more thought to the economic angles such as conservation of resources, and private - versus - public ownership of utilities.

The 700 foreign delegates are said to be greatly interested in the Tennessee Valley Authority as an experiment in coordinated use of water resources through regional planning.

The United States' program of rural electrification will be discussed and compared with progress in France, Sweden, South Africa, and other countries. An electrified farm, completely equipped from electric milking machines and flood lights for the barnyard to electric dishwashers and air-conditioning apparatus for the house, is Exhibit A in this department of the conference. The Virginia farm thus converted into an exhibit of the power age is already arousing public interest as one of the sights of the capital and its neighborhood.

Discussions of the international group, expected to be lively, are to be interpreted by a telephone device. A speech made in French or any other language will be translated simultaneously by a battery of interpreters each speaking into a telephone receiver. The translation will thus be relayed to the hall, where, by means of head phones and switches a delegate can listen in on the language he chooses.

Although 300 scientific papers have already poured into the headquarters of the conference, and several hundred more are expected, the conference will not have to listen to this avalanche of words in a babel of languages. Instead, the popular method of printing the speeches in advance will be adopted, and papers will be briefly summed up from the floor.

A series of technical study tours, planned for the weeks before and after the conference, will carry delegates to inspect such American power achievements as Boulder Dam, the Tennessee Valley projects, Grand Coulee Dam, and the Niagara Falls power development.

The Second Congress on Large Dams will be held in conjunction with the power conference, and will deal with strictly technical questions.

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ECOLOGY

Small Wild Animals Resist Drought Successfully

SMALL wild animals in the drought area are suffering less than livestock, the U. S. Biological Survey informed Science Service. Such lesser native creatures as prairie dogs, rabbits, ground-squirrels, and the owls, hawks and snakes that prey upon them, manage to pick up a living when pasture has failed for the bigger beasts. It is a case of the biological meek inheriting the earth.

Biological Survey scientists discount stories of wholesale migrations of jack-rabbits from South Dakota into Nebraska. Migrations have occurred from time to time, but they are always more or less local affairs, it was explained.

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PHYSICS

Science Warns Against Black Clothes Mode

THE NEW smart fashion of black clothing for summer wear has no support from the scientists who understand problems of heat. It might do for evening wear, but don't don a black dress and go out in the sun if you want maximum comfort. Rough, black surfaces are the best absorbers of heat known to science.

Smooth, bright surfaces reflect or turn away the heat. Science therefore does give support to these new bright helmets the boys are wearing.

If you don't believe it, here is a laboratory test you can easily try for yourself. Take two bright new tin cans with covers and tear off the labels. Fill both with cold water and set them out in the sun, but first rub lampblack on one of them. Later take the temperature in the two cans. The water in the blackened can will be much warmer than that in the shiny one.

Another warning about summer clothing from scientists. It is not the fabric that is loosely woven with wide air spaces between fibers that is the coolest. Air makes a good insulator for holding the heat of the body in. Wool clothing and furs are warm because the fibers are small and hold plenty of air between them. Linen is a cool fabric because the fibers are large and it has few air spaces.

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BACTERIOLOGY

Influenza Virus Carried In Air, Experiment Shows

PROOF that air can carry influenza and that ultraviolet light can rob the virus-laden droplets of their danger has come from research conducted by Drs. W. F. Wells and H. W. Brown at the Harvard School of Public Health (*Science*, July 17).

Changes in the handling of future influenza outbreaks are probable as the result of the new studies. Hospitals and physicians may find it advisable to irradiate the air of their rooms with artificial sunshine in order to stop the spread of the disease from sick to well.

In the experiments a famous strain of influenza virus, known as Puerto Rico 8, was used. This was originally obtained from a human patient in Puerto Rico and was used last year by Dr. Thomas Francis, Jr., of the Rockefeller Institute for Medical Research, to demonstrate the influenza virus and show that the same virus, a substance beyond the reach of the microscope in size, causes the disease in various parts of the world. Later this virus of human influenza was cultivated by Dr. Francis in vitro, that is, upon non-living food in a glass flask. Dr. Francis provided the virus upon which Drs. Wells and Brown worked.

In one of the experiments a liquid suspension of the virus was atomized into a large steel chamber, leaving in its air minute drops containing virus. This is very much like what happens when a person ill with influenza coughs. One sample of air was untreated while another was irradiated with a cold quartz mercury vapor lamp giving off ultraviolet light. The droplets from both samples were extracted by centrifuges and injected into ferrets to see whether they had the ability to produce the disease.

All the animals that were inoculated with material collected from the untreated air within an hour after suspension contracted influenza. Inoculations made later or with ultraviolet irradiated material did not carry the infection.

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SAFETY

Monoxide Made to Sound Alarm Against Itself

A LIGHT-weight portable device that rings a warning bell or sounds a horn when deadly carbon monoxide gas gets too plentiful in an airplane cabin or cockpit has been perfected by S. H. J. Womack and J. B. Peterson of the National Bureau of Standards.

Recent tests show that very small amounts of the deadly gas, contained in the exhaust of airplane and other engines, may be dangerous, particularly in high altitude flying. Only five parts in 100,000 of air are permissible at an altitude of 15,000 feet.

Earlier carbon monoxide indicators used commercially and by the U. S. Navy were modified and re-designed by the two Bureau of Standards scientists. The heart of the instrument is a cell containing a granular mixture of manganese dioxide and copper oxide, which changes the carbon monoxide into carbon dioxide with generation of heat. Accurate measurement of heat rise indicates the amount of the deadly gas present.

The National Advisory Committee for Aeronautics has made public the results of this research.

Science News Letter, August 1, 1936

IN SCIE

PHOTOGRAPHY

Non-Dazzling Photoflash Takes Pictures Secretly

A NEW non-blinding, non-dazzling photoflash lamp by which a person, it is claimed, could be photographed without knowing that he has had his picture taken, is the subject matter of a patent (No. 2,046,388) granted to J. H. Kurlander of Nutley, N. J.

The blinding and dazzling flash of conventional photoflash lamps, points out the inventor, is one reason why photographers are kept out of courtrooms and why some people do not care to be photographed by photoflash light. He calls attention to the fact that the human eye is most sensitive to yellow light and that it is the sudden flashing of yellow light from ordinary photoflash lamps which is responsible for the startling shock to the eye when a picture is taken.

The inventor has found that by coating the bulb of the lamp with a lacquer colored with a blue dye, little, if any, yellow light can get through the lamp when it is flashed. Although this dyed coating cuts down on the amount of light given off by the lamp, however, it is said, sufficient blue, violet and ultra-violet light pass through the glass bulb so that a good negative can be made.

The patent is assigned to the Westinghouse Lamp Co.

Science News Letter, August 1, 1936

BACTERIOLOGY

Sea Water Effective As Killer of Germs

THE ocean is the biggest and perhaps the best of all germ killers, Prof. Claude E. ZoBell, of the University of California's Scripps Institution of Oceanography, has found. Harmful bacteria can not survive any great length of time in raw sea water, his studies show. He has not found just what it is in the ocean that kills germs, because synthetic or manufactured sea water is not so germicidal as the real article.

Science News Letter, August 1, 1936

EE FIELDS

SURGERY

X-Ray Photograph Taken During an Operation

A SURGICAL operation on a Chicago medical student was interrupted recently and an X-ray picture was taken of the young man's kidney, which the surgeons had exposed.

From a study of the X-ray films, Drs. Herman L. Kretschmer and Faye F. Squires of Presbyterian Hospital were able to make a diagnosis of tuberculosis of the kidney, thus satisfying themselves that the organ should be removed.

The doctors had suspected renal tuberculosis, but when they exposed the kidney it appeared normal and they were undecided as to whether or not it should be removed.

The X-ray pictures cinched the diagnosis. This rare use of the X-ray machine is reported by the two surgeons. (*Journal, American Medical Association,* July 18.)

Science News Letter, August 1, 1936

PHYSICS

Tandem Balloons Record Strength of Cosmic Rays

TANDEM stratosphere balloons—four or more gas bags launched tied together—were set free by Dr. Robert A. Millikan, Nobel physicist, and Dr. Victor Neher, of the California Institute of Technology, Pasadena, in a new attempt to extend their researches upon cosmic rays.

Extremely sensitive and light apparatus were carried to heights that are unattainable with manned balloons and airships. Not until rockets are perfected is there any hope of reaching the distances above earth that the Millikan-Neher balloons promise to attain.

At extreme elevations of between 15 and 20 miles the recording instruments will be bombarded with cosmic radiations hundreds of times more intense than at sea level. Moreover, some of the most interesting rays never get down to more accessible regions at all.

Five flights are planned. With the breaking of one of the balloons in a tandem string, the journey of the instruments back to earth will begin. Each balloon leaves the earth inflated to a diameter of four feet and at the highest or bursting altitude it reaches a diameter of about fifteen feet. The fall of instruments to the ground is broken by the automatic opening of a parachute.

Each flight will take only a few hours, but high winds in the stratosphere may carry the balloons several hundred miles. Drs. Millikan and Neher hope that at least half of the instruments will be found after their fall to earth and will be returned to them. In addition to receiving a small cash reward, the finders will be performing a service useful to science.

The instruments carried aloft by the balloons weigh only two pounds. Yet they contain five devices of special design and automatic operation. These are the cosmic ray electroscope designed by Dr. Neher, a camera, a clock, a thermometer, and a barometer. Dr. Millikan is the pioneer in this type of cosmic ray research and the instruments used were developed at the California Institute of Technology.

Records obtained in the flights will be especially important because there is very little information about the cosmic rays in the stratosphere at such low latitudes as San Antonio. Scientists consider low latitude observations important because they show how much of the cosmic radiation is composed of charged particles which cannot easily approach the earth in those low latitudes due to the magnetic field of the earth there.

Science News Letter, August 1, 1936

ENTOMOLOGY

Mormon Cricket in West Kin to Grasshopper

GRASSHOPPERS have an ally in a related insect, the Mormon cricket, in the northern Rocky Mountain area of Montana and Idaho, and also in Nevada. These crickets, big, clumsy, non-fliers with tremendous appetites, have been raising a great deal of trouble in their limited range. They do not threaten to spread eastward, for the Mormon cricket is distinctly an insect of the Far West.

Appeals continue to come in to the U. S. Department of Agriculture for more poison-bran bait for the still unconquered grasshoppers throughout the West, but there is nothing more to send. The small appropriation provided by Congress in the pre-adjournment rush is totally exhausted, and no more funds are in sight.

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BIOLOGY-CHEMISTRY

Citrus Laboratory Opened For Basic Citrus Research

A NEW laboratory for basic research in the biological and chemical problems of handling and processing citrus fruits and their products has just been opened at Dunedin, Fla. It is to be known as the Florida Citrus Research Laboratory, and was founded by B. C. Skinner.

Dr. Rodney B. Harvey, for sixteen years professor of plant physiology at the University of Minnesota, has been placed in charge of the laboratory. Dr. Harvey developed the now widely-used process of speeding fruit-ripening by means of gas treatment, and also a method of adding attractive color to the skins of oranges and other citrus fruits. With him are associated Dr. Longfield Smith, plant chemist, and J. J. R. Bristow, chemical engineer.

Science News Letter, August 1, 1936

MEDICINE-PHYSICS

Silicosis Detection Helped By Spectroscopic Method

ABSOLUTE identification of silicon in the lungs of supposed victims of silicosis, the dust disease now being intensely combated after the national attention focused on the Gauley Bridge, W. Va., situation, is possible through use of the spectroscope, Miss Mary E. Warga of University of Pittsburgh's Mellon Institute of Industrial Research, announced before the Massachusetts Institute of Technology spectroscopy conference.

By breaking up light from the suspected material by means of a prism, the chemical elements contained can be detected from the rainbow produced. In the case of suspected silicotic lungs, amounts of silicon as minute as one or two parts per thousand are positively detected by the spectroscope, whereas usual chemical methods of detecting silica in such small amounts are difficult and time-taking.

Miss Warga has also turned the spectroscope to practical use in detecting glass impurities, dust composition, coal ingredients, tin impurities and the cause of stains on cloth. She was a scientific detective in the case of troublesome discolorations of cloth during manufacture. The spectroscope told that copper caused the stain and a bronze roller was found to be the cause.

Science News Letter, August 1, 1936

AGRICULTURE-INDUSTRY

The Soybean Goes to Town

Used in Scores of Products, From Noodles and Beer to Steering-Wheels and Paint, Chinese Bean Shows Versatility

By DR. FRANK THONE

SOYBEANS have been champed by pigs, and soybean hay and silage chewed by placid cows on American farms for a good many years now. But pigs and cows are not as a rule excitable animals, so that this transplanted Chinese crop has gone on in the even tenor of its way without stirring up very much talk outside of farm circles.

But now, almost suddenly, the soybean has started to go to town. Industry has discovered the soybean as a raw material, out of which all manner of things, from glue to doorknobs, may be made, and city folk have begun to see visions of the country rolling back to prosperity in a magic chariot popped out of a soybean pod.

Food for Recovery

Well, not exactly that, perhaps; but it is true that there has been a lot of boom talk about soybeans in industry. Wise industrialists cross their fingers when they hear talk of this kind. Most of them can remember things at least as much as seven years: they have had their fill of boom; and want no more out of that dish, thank you. But as an element making for recovery, and increasingly important in the development of new businesses, they are quite awake to the existing possibilities of this agricultural gift from Old Cathay, and some of them are having chemists look still further into possibilities as yet unexplored. And at the University of Illinois, noted for both agricultural science and chemistry, Government action has made possible the opening of a special soybean research center. Soybean things are all set to begin happening.

But what then can these much touted soybeans do?

Really, quite a lot. We all saw an impressive array of motorcar gadgets at the Century of Progress in Chicago a few years ago, that Henry Ford had started making out of the solid parts of soybeans—dashboard panels, gearshift knobs, distributor cases, and so on. He's still making them by hundred-thousands.

But these are not the really important products of soybeans. Such things can be made in a dozen different ways, out of the dozen new products of the organic chemist's arcanum, lumped rather vaguely as "plastics." The shiny gadgets on your car or radio may be made of soybeans, or of Bakelite, or of something else of less familiar name. In this field, soybeans have plenty of competition; it is as much Henry's gifts as a first-rate industrial showman as their own merits that have given these soybean products so much of the spotlight.

Wallpaper and Glue

Besides their use in these solid forms, that you see whole and by themselves, soybean plastics have begun to get into a whole series of applications in which they are combined with something else. Beautiful high-grade wallpapers coated with a soybean product, for example, and laminated wallboard in which the thin sheets of wood veneer are solidly held by a vise-gripping soybean glue. These soybean adhesives particularly will bear watching.

But soybean plastics are rather less than half the story, as industry sees it. The best thing that the soybean brings to town is its oil.

It is the oil in the soybean that makes it blessed above all other beans, in the eyes of industry. The digestible part of most beans consists of about one-quarter protein, three-quarters starch, and no oil. The corresponding part of the soybean consists of one-third protein, two-thirds oil, and no starch.

That oil is one of the relatively few kinds in the world that can be used in the making of paints, enamels, etc. That is what has made the soybean such a welcome guest at the council tables of industry and on the laboratory bench of chemistry.

Oil Requires Processing

It isn't all plain sailing, mind you. You can't just take a bushel of soybeans, squeeze the oil out of them, mix in zinc oxide, white lead, or what have you, and proceed to daub it on your house. Like all other paint oils, soybean oil requires processing, and it works best when mixed with one of the other paint oils, like linseed oil or the newer product of the South, tung oil—also a Chinese immigrant.

Moreover, tung oil paints have to face the conservatism of painters and the paint business, who have always regarded "b'iled linseed 'n' white lead" as an unbeatable combination—the only proper stuff to coat a house with. However, science has a way of winning over tradition in the long run, particularly when science-backed business is able to point out to farmers that they can thus use one of their own products at home. Besides its use in paint, soybean oil is enjoying increasing utilization in baked finishes on automobile bodies, electric refrigerators, etc.

THE CROP LOOKS GOOD: IN A SOYBEAN FIELD DOWN SOUTH

SOYBEAN CUPBOARD—WELL FILLED

There are three ways of getting the oil out of soybeans. Oldest is pressing, and it is also the least efficient process, leaving a good deal of oil in the seed-cake. A second and much more efficient mechanical process is known as expelling; it applies terrific pressure for short periods to quite small quantities of the beans, and gets out a much greater percentage of the oil. A still newer process, also highly efficient, is extracting. The ground beans are submitted to the action of a chemical solvent, like benzine, which dissolves out practically all the oil. The volatile solvent is then distilled off and condensed, to repeat the process on the next batch.

Economical and Efficient

Extraction is thus very economical as well as very efficient. It can also be used in rather small plants, such as a farmers' cooperative group could set up for themselves. However, it has the element of danger that is always present where inflammable liquids are being vaporized. A leak in the apparatus, a chance spark or careless cigarette—and you have another industrial disaster. At least two such soybean oil extractor explosions have occurred within recent months. Manufacturers of extractor apparatus, having learned from the fatal experience of others, are now bending every effort toward making their machines at least as leakproof as the coils of a mechanical refrigerator.

The residue of the soybeans, after the oil has been taken out, is the press-cake, which is the raw material of the soybean plastic products. But by no means all of it goes to make knobs or wallpaper surfacing or glue. The farmer himself wants by far the greater proportion of it back, for it is one of the greatest high-nitrogen stock feeds known, having an edge even on the old favorite cottonseed meal for that purpose. Also, if he likes, he can spread it on the soil and plow it under, as fertilizer.

As a matter of fact, probably the larger part of the soybean crop never goes to town at all, except indirectly. The beans were first grown in this country a couple of generations ago for stock feed, and in large measure they serve that purpose still.

For Mixing With Silage

The plants, which stand up straight and bushy, can be cut and cured for hay, or they can be fed into the silage cutter green, mixed with green cornstalks, to be served up during the winter as "bovine sauerkraut." Silage with a soybean addition has a higher protein content than straight cornstalk silage, which is of course very desirable from a meat-and-milk making viewpoint.

The versatile soybean also has another important role to play on the farm. Like all members of the legume family, it harbors colonies of bacteria in its roots, which capture nitrogen from the air and make it available as food for the higher plants. Soybeans are therefore often grown simply to be plowed under, as green manure. They have been given official recognition as a "soil-building crop" in the new soil conservation program of the U. S. Department of Agriculture; farmers are to be given benefit payments for planting soybeans and then plowing them under.

While soybeans have been grown in America for a couple of generations at least, their wide cultivation is relatively recent. As late as the beginning of the present century, there were only about eight varieties of them in the United States, though China, where they have been grown for centuries, had several hundred kinds of them.

Fifty Varieties Listed

During the past three decades, however, many more varieties have been imported, and new ones originated by American breeders to fit American conditions. Probably more than a thousand kinds of soybeans, altogether, have been tested in this country. At present, seedsmen list some fifty varieties.

Last year's soybean crop was the biggest ever harvested in the United States; it was well over 30,000,000 bushels. Most of it was grown in the Corn Belt states, for soybeans and corn seem to like about the same things, in soil, temperature, and rainfall. A big boost was given to the acreage as an indirect result of one year of dreadful heat, 1934. Chinchbugs, that thrive on heat and drought, swarmed in billions of billions, ruining vast acreages of corn and small grains. Since soybeans can be planted late and still mature at least a hay harvest, much of the devastated acreage was re-planted to soybeans. In Iowa alone, the soybean acreage was increased seven-fold in that one year. "It's an ill bug that brings no benefits."

The soybean's versatility is not a matter of American ingenuity alone. We have thought of new uses for it, to be sure, but the Chinese, during their many centuries of acquaintance with it, have produced practically every form of food from it. They make a soybean milk, which looks and tastes like cow's milk (except for a slightly "beany" flavor), and in a cowless land is the daily drink of millions of children. The residue, a soybean curd, looks and tastes very much like cream cheese.

A One-Ingredient Meal

The beans themselves are boiled for the table, and eaten in a dozen other ways, including the succulent bean sprouts you fish for in your plate of chow-mein, and salted parched soybeans

THE BUSH AND THE BEANS

that are much like roasted peanuts. It is quite possible to make up a reasonably complete, appetizing meal out of soybeans alone.

We are beginning to appreciate their value as food, too, in the Occident. Canned soybeans are on the market, and soybean flour is at a premium among knowledgeable housewives.

And finally, there is our old friend, the soybean sauce of the chop-suey restaurants—that dark stuff in the hair-tonic bottles, that has such a tangy, salty taste. It is made by fermentation, and after proper aging is shipped to this country. That is, the cheaper kind of "dragon's blood" comes here. The really choice varieties, aged in jars for years, with daily exposure to the sun, are for merchants and mandarins, not export.

It is this sauce, incidentally, that gives the bean its name. Called *sho-yu* in Japanese, *tsŭ-yu* in the Chinese of Canton, and with other variants in pronunciation, it easily becomes *soya* or *soy* in English. The original form of the word means "salted bean sauce."

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ZOOLOGY

Robs Hawk of Mouse, But Pays Back Five

A HAWK in the Lava Beds National Monument, California, lost a lunch recently, but gained a dinner, all in the cause of science.

Field Naturalist Joseph S. Dixon and Dr. R. M. Bond of the National Park Service staff were making a biological reconnaissance of the area, with special emphasis on the bird life.

Mr. Dixon, in his quest for facts, peered over a rocky eminence into a hawk's nest. Inside the nest lay a fine specimen of kangaroo mouse. Mr. Dixon coveted the specimen for his collection, so carried it away. Evidently, however, his conscience hurt him as he thought of the disappointment of the hawk, when it discovered the theft. So shortly he returned from the base of the cliff, carrying five field mice which he carefully laid on the nest.

David H. Canfield, Superintendent of Crater Lake National Park and also in administrative charge of the Lava Bends National Monument, reported the incident, saying that in view of it he would be glad to lend Mr. Dixon the price of a lunch anytime, with the expectation of getting a dinner back.

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INVENTION

Individual Loudspeakers Quiet "Drive-In" Theaters

NEIGHBORS of "drive-in" motion picture theaters, the kind where patrons drive in and sit in their autos while seeing and listening to the show, would not be annoyed by the loud blasts of the screen's loudspeakers, if a new way of quieting the "talkies" should go into widespread use.

Individual loudspeakers for each car is the feature of the invention for which a patent (No. 2,045,180) has just been granted to G. Douthwaite of Los Angeles, Calif. Each parking space in the open air theater would be provided with a loudspeaker. A car would pull into the parking space and drive up a ramp until the radiator of the auto would almost contact with the cone of the loudspeaker.

In this way sound would travel from the loudspeaker, through the radiator of the car, through the dashboard into the auto proper. Each car would thus be literally coupled to a loudspeaker through its radiator. It is claimed that sound is confined to the car, and little escapes to the open air and the surrounding neighborhood.

Like parking meters, the system also may be conceivably used for radio listening on a meter basis. Cars not provided with auto radios could pull into such a radio listening station, and tune in.

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BIOCHEMISTRY

Experiments Show Nature of Chemical Action of Enzymes

CHEMISTS who study the reactions occurring in the human body have been struggling, for years, to learn something of the nature of the mysterious products called enzymes which appear to make possible many of the biochemical happenings on which life itself depends.

Experiments which tend to reveal the exact chemical action of the enzymes in the digestion of protein compounds have recently been reported to the New York section of the American Chemical Society by Dr. Joseph S. Fruton of the Rockefeller Institute for Medical Research.

The proteins of our foods furnish us with the nitrogenous material which is so necessary in building up our own tissues. But to do this they must first be broken down into simpler products by the action of our digestive secretions in the stomach and the intestines. The digestive secretions act upon these proteins by means of the enzymes or ferments that they contain. How the enzymes attack or react with the large protein molecule and break it up into simpler compounds that can be absorbed into the blood is one of the difficult chemical problems that physiologists have long been attempting to solve. Dr. Fruton reports experiments by himself and others which indicate a method that promises eventually to solve this problem.

The protein molecule is a complex structure built up of hundreds or thousands of atoms of carbon, hydrogen, nitrogen and oxygen. It consists of a long chain of simple acids, known as amino acids because each contains an amino group, (NH_2) Organic chemists can take these simple amino acids and make them unite in chains containing two or a dozen or more, and in this way can synthesize molecules of the same nature as the protein molecules that occur in living tissues, only less complex. These synthetic molecules are acted upon by certain enzymes and broken up into their constituent amino acids in much the same way as the proteins of food are affected by the digestive secretions. Since the chemist can determine the number and location of the various amino acids in any synthetic molecule he can ascertain when the enzymes make their attack upon it.

Dr. Fruton presents evidence to prove that some enzymes act upon the end groups of the chain of amino acids, while others attack the linkages toward the center of the molecule.

By methods of this kind systematically applied it is hoped that the nature of the enzyme reactions will be disclosed. He suggests, moreover, that since certain viruses are attacked by enzymes of this class (carboxypeptidase) whose mode of action is known, it is possible that further work on these lines may throw light upon the structure of these mysterious agents of disease.

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ENGINEERING

New Type Watercraft Has Aerodynamic Features

A NEW and unique type of watercraft, said to have a hull efficiency more than one-third greater than any motor boat of previous design, has been successfully tested by a Portland, Oregon, inventor.

Known as the Strode Aerohydrocraft, the boat is unique in that it incorporates for the first time both aerodynamic and hydrodynamic principles in design.

The hull of the craft is similar in construction to the wing of an airplane and has, extending from its sides, a wing-like structure composed of airtight compartments. These wings serve to give "lift" to the boat when it is in operation. It is powered with a stock light car engine. V. W. Strode of Portland is the inventor and holds basic patents on his development.

Because all previous boats have been designed and improved with consideration given from deck line to keel, while the Aerohydrocraft combines aerodynamic and hydrodynamic principles, Mr. Strode calls his new development the first radical departure made in boat design since man began the building and use of boats.

The top service speed of the new craft is at present 40 miles per hour, although further development is expected to make for even greater speed. The aerodynamic features are said to give it an unusual riding ease.

Complete and scientific streamlining of the boat serves further to augment its efficiency.

In addition to being more efficient in operation, the hull of the new type craft is non-sinkable and non-capsizeable. Following tests, the boat was taken over by the city of Portland, where it is being used as an ambulance and first aid boat on the Willamette river.

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HAS AIRPLANE LINES, BUT RUNS ON WATER

CONSERVATION

Yellowstone Elk Menaced By Failure of Range

YELLOWSTONE'S ten thousand elk of the Northern Herd face starvation and death during the coming winter, because of the unprecedented failure of their rangeland and of the fields where hay is normally grown for their winter use. A survey of the situation shows a falling off in density of forage vegetation of 27 per cent, as compared with the figures for last year.

Not only is the total amount of vegetation decidedly less, but what is left is qualitatively less fit for animal consumption. The palatable grasses have been largely burned out or eaten off to the roots. Their place is taken by various kinds of undesirable weeds and unpalatable brush. This means not only bitter hard times for the elk during the coming winter, but also very slow recovery of the one-time rich game rangeland. The pasture will be years, perhaps decades, in coming back.

"Perhaps the most distinct indication of volume of forage that will be available during the coming winter is the height of forage plants," the report continues. "The average height of all plants examined in the plots is 65 per cent less than in 1935. In several instances the quadrats examined did not contain a single grass seed stalk, while in the previous year a good seed crop was produced. Seedling crops have been totally lacking this year or have died due to weather conditions.

"Unusually high temperatures along with hot, dry winds melted the snow in early April and caused very rapid run-off. The rapid melting of snow did not permit the soil to absorb a normal, or even a slight amount of moisture. An abnormally dry period followed in May and in the Gardiner area only .21 inches of precipitation was recorded during the month.

"June had a more normal rainfall but this was largely offset by high temperatures, and the fact that rainfall occurred in a short time with run-off high. Combined with the high temperatures were several wind and dust storms that greatly increased evaporation.

"It is obvious to the layman examining the winter game range that a critical condition exists, and that action is necessary to even maintain forage at its present status."

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BIOLOGY

Gland Secretion Causes Color Changes in Lizards

THE little color-changing lizards they call chameleons in Florida do not depend on their nerves to control their shifts in hue, but on the secretion of one part of the pituitary gland, a tiny organ situated close to the brain. This is indicated by recent researches of Dr. L. H. Kleinholz of Harvard University (*Proceedings of the National Academy of Sciences*, July).

Dr. Kleinholz used several approaches to the problem. He found that cutting nerves did not affect the lizards' color-changing ability, but that removal of the pituitary gland left them unchangingly green. But injection of extracts of the gland, from other animal sources, at least temporarily restored the color responses.

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AGRONOMY

NATURE RAMBLINGS
by Frank Thone

The Curse of the Plow

See Front Cover

A SUPERSTITION, false in itself, is sometimes true in a wide symbolic sense never guessed at either by the people who entertained or those who refuted it.

The plow has been the subject of two strange superstitions in America, one by Indians, one by white men. When iron plows were first introduced, something over a century ago, many farmers insisted on retaining their old, admittedly inefficient wooden implements because, they said, iron plows would "poison the soil and make it unfit for growing crops." They soon got over their nonsense, of course, and presently everybody was using iron plows.

Two or three generations later, when their descendants were streaming out into the Western prairies and plains, in wave after wave of tremendous, land-hungry migration, the hostile Indians held as much enmity against their plows as they did against the men who brought them. Time after time, when raiding Indians attacked wagon trains, they spent their most vindictive arrows, and even their precious powder and shot, on the inanimate farm implements. Captive redskins explained that the plow would "bury the buffalo, and then the Indian could hunt no more."

That also was a rather absurd notion on the face of it. Yet in a few years the buffalo were gone as effectually as though the plow had buried them, and the Indian hunted no more. The plow had banished the buffalo as surely as if if it had buried that moving larder of the Plains Indian, for plowed wheatland and native grassland range for buffalo could not occupy the same place at the same time.

And now, in years of drought and duststorms and floods, we are seeing how truly "poisonous" the plow can be to the soil itself, if used without knowledge or regard for the laws of nature. For one of the heavy contributing causes of westward migration in the middle of the nineteenth century was the increasing poverty of farmlands in the East, cultivated too closely for permanence of the soil by the early generations of farmers. With the iron plow, and the great progeny of improved agricultural implements that followed it, the farmer could loosen the soil more deeply, turn out stones and roots that would have wrecked his old wooden plow, and thus exposed more and more land to the destructive forces of erosion. So he had to move on.

And where he went, he repeated the fatal errors he had made in his old home. Not in wantonness or malice, but in sheer ebullience of energy and hopefulness and ambition, he broke with his plow the sod of the Plains. And like a furious genii at the breaking of a seal, the demons of dust and drought have risen to curse the plow. We shall have much ado to exorcise them.

(The picture of the plow, abandoned in the desert it helped to make, is from the dramatic film, "The Plow That Broke the Plains," prepared by the Resettlement Administration.

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ECOLOGY

Rhododendrons Aided By Freezing Weather

FREEZING is a good thing for young rhododendron bushes—it kills the wilt fungus that is prime enemy of nursery stock of this favorite ornamental shrub, and hence a cause of high prices. Dr. Richard P. White of Rutgers University has discovered that cold eliminates the fungus without harming the hardy bushes, which are used to severe winters in their native mountains.

In general, says Dr. White, culture conditions for rhododendrons should simulate nature as closely as possible: cool, light, acid soils with plenty of leafmold; not too much irrigation.

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•First Glances at New Books

Photography

ELEMENTARY PHOTOGRAPHY—C. B. Neblette, Frederick W. Brehm, and Everett L. Priest, *Macmillan,* 253 p., 72c. Along with a youngster's first camera, even if it be the simplest box type, he should get this book. It sets forth basic principles in simple terms, explains how pictures turn out as weird messes through carelessness or failure to think of an important factor at an important moment, and is packed with practical directions on how to do and how to make.

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Photography

COLOUR PHOTOGRAPHY—Robert M. Fanstone—*Pitman Publishing Corp.,* 171 p., $3.75. A simple but thorough and practical guide to natural color photography in all its phases. Throughout, what to do is backgrounded with adequate explanation of why you do it.

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Geography

ATLAS OF CHINA—Albert Herrmann —*Harvard University Press,* 112 p., $5. The geographic history of China is told in a series of maps, indicating boundaries, cities and other features at the various periods. Another series of maps shows modern China, its resources, industries, and communication routes as well as political boundaries. Prehistoric sites known in China today are the subject of one map, with ages of sites indicated by symbols. The University of Berlin's professor of historical geography is the author of this interesting work.

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Ethnology

RESEARCH IN PRIMITIVE AND FOLK MUSIC IN THE UNITED STATES—George Herzog—*American Council of Learned Societies,* 97 p., 25c. A survey of material that is rapidly disappearing in this country. The author points out that primitive music has at least been recognized as a branch of anthropology or musicology; but folk music has had less attention. In both fields, he believes, there is need for competent research.

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Bibliography

INDEX TO DEPARTMENT BULLETINS NOS. 1-1500—Mabel G. Hunt—*Govt. Print. Off.,* 384 p., 25c. A useful aid to persons using this series of U. S. Department of Agriculture publications. Indexing is by both author and subject. Page references are given as guides where more than one subject is treated in a bulletin.

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Geography

SOUTHERN REGIONS OF THE UNITED STATES—Howard W. Odum—*Univ. of North Carolina Press,* 664 p., $4. The University of North Carolina has built itself a reputation as a leading center of the South's highest culture, and Prof. Odum, as a scholarly expositor of some of its most significant phases, has had no small part in that construction. The present volume is a complete and thorough examination of the geography and economics of the South, with historical background but with greatest attention to present status, and with a clear and careful eye toward what is to come. Whoever needs or desires to understand the South as it now is, or expects to have dealings with the South as it is to be, must study this book.

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Agricultural Economics

AGRICULTURAL ECONOMIC FACTS: BASEBOOK OF IOWA—Lauren K. Soth —*Iowa State College, Ames,* 179 p., 50c. Crammed with well-analyzed statistics on acreages, production, and value of both major and minor crops and farm animals, illustrated with well-planned graphs and maps, and supplied with well-written sections on the bearings of these factors on human life within the state, this publication is a model which other states might find it advantageous to follow.

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Entomology

DISTRIBUTION OF THE ARGENTINE ANT IN THE UNITED STATES AND SUGGESTIONS FOR ITS CONTROL OR ERADICATION—M. R. Smith—*Govt. Print Off.,* 39 p., 5c. A useful pamphlet on an introduced pest that is becoming increasingly troublesome in the warmer parts of the country.

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Ornithology

BIRDS IN THE WILDERNESS—George Miksch Sutton—*Macmillan,* 200 p., $3.50. Dr. Sutton has been in the far places of the world, looking at what lives there. In this book he tells of his acquaintance with birds all over the greater part of North America, from the Hudson Bay country to the Rio Grande. He did the drawings for the illustrations, too, and they are worthy of the text.

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Conchology

STRANGE SEA SHELLS AND THEIR STORIES—A. Hyatt Verrill—*L. C. Page & Co.,* 206 p., $2. Shells, and the natural history of the creatures that live in them, and the uses to which both the shells and their inhabitants are put, form the subject of this unique and fascinating book. Written avowedly for the younger audience, it will nevertheless be both useful and entertaining for their elders.

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Botany

THE LIVING GARDEN—E. J. Salisbury —*Macmillan,* 338 p., $3. A garden book of unusual interest and charm, with a great deal more of botany and especially of plant ecology in it than one usually encounters in works of this nature. The illustrations are mostly carefully executed line drawings—really an improvement over the halftones ordinarily used in garden books.

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Physics

LES PHÉNOMÈNES PHOTOÉLECTRIQUES ET LEURS APPLICATIONS—G.-A. Boutry—*Hermann & Cie, Paris,* Vol. I, (Phénomènes Photoémissifs), 100 p., 20fr., Vol. II, (Cellules Photoémissives), 57 p., 15fr., Vol. III, (Photoconductivité), 84 p., 20fr., Vol. IV, (Différences de Potentiel Photoélectriques), 49 p., 15fr., Vol. V, (Photométrie Photoélectrique), 50 p., 15fr., Vol. VI, (Photométrie Photoélectrique) 72 p., 15fr.

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